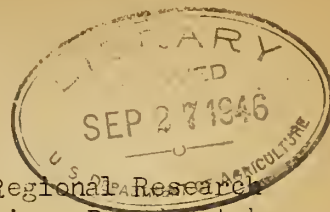


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(Farm Science Serves the Nation No. 3)

PENICILLIN -- LIFE-SAVING DRUG



Report on penicillin, including work done at the Northern Regional Research Laboratory, U. S. Department of Agriculture, Peoria, Illinois. Broadcast by Ernest Moore and Duke DuMars, Office of Information; and Dr. O. E. May, Chief, Bureau of Agricultural and Industrial Chemistry, U.S.D.A. Script by Josephine Hemphill. Recorded Wednesday, November 22, 1944. Time: 7 minutes, 43 seconds without announcer's parts.

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ANNOUNCER: (LIVE)

From the United States Department of Agriculture -- a visit by transcription with our Farm Science Reporter Ernie Moore, and his friend Duke DuMars, who wants to know the answers. Today they're going to tell us about that amazing new life-saving drug -- penicillin. (Pen-i-SILL-in.)

TRANSCRIPTION

ERNEST MOORE:

Since our friend DuMars wants to learn all about penicillin, in one easy lesson, I've fixed him up a little exhibit today -- right here on this table.

DUKE DUMARS:

Ernie, what does this lemon have to do with penicillin?

MOORE:

Nothing much -- to tell the truth.

DUMARS:

Then why --

MOORE:

Have patience, Duke. In a few minutes we're going to hear from Dr. O. E. May, Chief of the Bureau of Agricultural and Industrial Chemistry. This Bureau has a Laboratory in Peoria, Illinois, which does research work on penicillin. But now -- let's get on with our exhibit. Isn't this lemon a beauty?

DUMARS:

I never cared much for lemons covered with green mold.

MOORE:

This mold, my friend -- this ordinary green mold -- is kin to the mold that produces penicillin.

DUMARS:

Is that a fact?

MOORE:

Sure it's a fact. They're what you might call first cousins.

DUMARS:

But this cousin on the lemon has never become famous.

MOORE:

No, it doesn't make penicillin. Have you ever seen that medicine?

DUMARS:

I never have.

MOORE:

Here it is, Duke. Right here in this bottle.

DUMARS:

A yellow powder.

MOORE:

Here -- don't take the lid off!

DUMARS:

It won't come off.

MOORE:

It isn't supposed to.

DUMARS:

Why not?

MOORE:

Penicillin isn't generally used in powder form. The doctor takes his needle, punctures the top of the bottle, and fills the bottle with a salt solution.

DUMARS:

Then it's injected into the patient?

MOORE:

Yes. And what it can do — in a severe case of pneumonia or blood poisoning — is a plain miracle. Now take a look at these two other bottles.

DUMARS:

This looks like molasses.

MOORE:

No, that's corn steeping liquor. A by-product they get in making corn starch.

DUMARS:

This other one looks like flour.

MOORE:

That's milk sugar. Recovered from whey. A by-product of cheese-making.

DUMARS:

Am I to infer that corn and milk have something to do with penicillin?

MOORE:

Such an inference would be quite in order. You know who discovered penicillin?

DUMARS:

An Englishman, wasn't it?

MOORE:

It won't take a minute to tell you all about it. The time is 1929. The scene — a laboratory in St. Mary's Hospital, London. The scientist — Dr. Alexander Fleming. On his work bench there's a small glass dish containing millions of bacteria.

DUMARS:

What kind?

MOORE:

Staphylococci.

DUMARS:

Staphylococci...Boils and abscesses?

MOORE:

Yes — and blood poisoning, and bone infections. While Doctor Fleming is examining these bacteria, he notices something very strange and peculiar. A speck of green mold has drifted in from nowhere.

DUMARS:

Like the mold on this lemon here?

MOORE:

Looks like it, yes.

DUMARS:

But what's strange about that?

MOORE:

Something's going on, Duke. Around this speck of green mold the bacteria are disappearing. There's a clear circle around the mold. A sort of halo.

DUMARS:

I don't get it.

MOORE:

You don't?

DUMARS:

You mean the mold is killing the bacteria?

MOORE:

Something is. And killing 'em fast! Doctor Fleming has a hunch. If there's something in the mold -- that will kill off the bacteria in the glass dish -- maybe it will kill the same deadly disease germs in the human body.

DUMARS:

Then it wasn't the mold itself.

MOORE:

No, it was a substance excreted by the mold. The mold itself was a member of the Penicillium family, so Doctor Fleming named this substance "penicillin."

DUMARS:

And the discovery of penicillin was just a kind of accident?

MOORE:

A most remarkable accident. I wonder, Duke. What if you'd been in the laboratory that day?

DUMARS:

Oh, I'd probably have been so annoyed -- when I found stray green mold in a culture of bacteria -- I'd have thrown the whole thing down the sink!

MOORE:

For the sake of humanity I'm mighty glad you weren't there.

DUMARS:

So am I. Wasn't Doctor Fleming pretty much excited?

MOORE:

Well -- not according to his report.

DUMARS:

What did he write? "Eureka"?

MOORE:

No -- here's what he wrote: "It was noticed that around a large colony of a contaminating mould, the Staphylococcus colonies became transparent and obviously undergoing lysis."

DUMARS:

Lysis.

MOORE:

That means they were dissolving. Like sugar in water.

DUMARS:

I see.

MOORE:

Doctor Fleming also reported that penicillin might have some possible use in the treatment of bacterial infections.

DUMARS:

And this report was made in 1929.

MOORE:

That's the year penicillin was discovered.

DUMARS:

But why -- have we had to wait so long --

MOORE:

Because, Duke -- nobody had the slightest conception of what this discovery was going to mean. Second, it was almost impossible to get enough penicillin to try it out. Ten years later, a group of scientists at Oxford University managed to get enough of the drug -- by very tedious methods -- to actually see what it would do. The results were unbelievable. Sick people so far gone that everybody had given up hope for their lives -- were cured with this magic drug.

DUMARS:

But still they couldn't figure out any way -- to get a supply.

MOORE:

Remember -- England was at war. Who was going to stop to do research? Figure out ways to increase the yield of penicillin? Even more important -- where could they get the labor and equipment to make the drug? Finally, after two years of hard work, Dr. H. W. Florey, in charge of the penicillin work at Oxford, and one of his colleagues, Dr. N. G. Heatley, were brought to America by the Rockefeller Foundation.

DUMARS:

Had anybody in this country ever worked on penicillin?

MOORE:

No, not on penicillin. But for fifteen years scientists in the Department of Agriculture had been investigating the use of molds, for making chemicals and pharmaceuticals.

DUMARS:

So that's where the Department comes in.

MOORE:

That's it, Duke. At the Research Laboratory in Peoria they have one of the biggest mold collections in the world. What's more important, they know how to put 'em to work. Well, the British scientists arrived at the Laboratory in July, 1941, and they stated their problem: how to increase the yield of penicillin. Doctor May, you were there. Did you hold out much hope to the visitors from London?

DR. MAY:

Yes, we did. Before Doctor Florey left we felt sure we could increase the yield of penicillin — which was pitifully small. Within a few months we discovered that the mold would produce much more penicillin on a diet of corn steeping liquor. To make my story short — (and leaving out all the headaches) — in a few more months we had increased the yield by as much as twenty times.

MOORE:

That made it possible for the industry to get started.

DR. MAY:

That's right. Since then — by improving mold strains, and adding milk sugar to the diet — we've brought the yield up to one hundred and fifty times what it was when we started.

MOORE:

How many commercial plants are making the drug now?

DR. MAY:

Twenty in the United States and Canada. Most of these plants are using methods based on those we developed, and all are using mold strains we selected. Incidentally, these commercial plants represent an investment of over 20 million dollars.

DUMARS:

They must have been built in a hurry!

DR. MAY:

They were. The Army and Navy wanted to get ample supplies of the drug before D-Day.

MOORE:

Of course the fighting forces have first call.

DR. MAY:

That's true, but the drug is now being made so fast — more and more is going to civilians. It's already been allocated to over 2,000 hospitals. Penicillin doesn't cure all diseases, by any means — but it certainly is a godsend in most types of pneumonia, in blood poisoning, serious burns, venereal diseases, gas gangrene, bone infections, and all types of war wounds, especially those requiring brain surgery.

MOORE:

For civilians— What's the cost of a small bottle of penicillin? The size of this bottle here.

DR. MAY:

For a small dose that size -- which goes a long way — the cost varies from around four to around eight dollars. Of course it will be even lower as methods for making the drug are improved.

DUMARS:

Doctor May, I know the Laboratory in Peoria doesn't make penicillin commercially,

DR. MAY:

No, not commercially. We do the research.

DUMARS:

But don't you have a lot of calls for advice?

DR. MAY:

We're called on every day. We've had visitors from Canada, England; Chile, Brazil, China -- Australia. Some of the drug made in Australia went to our troops in the Southwest Pacific, under reverse Lend-Lease.

MOORE:

That's getting it out fast, all right. But when the scientists in Peoria learned how to increase the yield, the whole thing grew so fast you'd hardly believe it.

DR. MAY:

Yes, a whole new industry in two years. And right here I want to take my hat off to the physicians who found out how and where to use the drug -- and to the chemical and pharmaceutical companies, for one of the most outstanding jobs of the war. They took up where we left off, and got large-scale production in an awful hurry.

DUMARS:

And it all goes back -- to a man who happened to see a tiny little speck of green mold -- and noted what it was doing.

DR. MAY:

What that mold needed most was the right kind of diet -- a diet based on two farm products, corn and milk -- to make it produce a drug that is saving hundreds of thousands of lives.

MOORE:

It really is a modern miracle.

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ANNOUNCER (LIVE)

You've heard a report on the new life-saving drug, penicillin. Methods for producing penicillin on a commercial scale were discovered by scientists of the United States Department of Agriculture, at the Northern Regional Research Laboratory, in Peoria, Illinois. This is the third in a series on how "Farm Science Serves the Nation" -- and the world.

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